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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/039,296

10/19/2001

James Stephenson

054998/0002

2104

31013

7590

10/14/2005

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EXAMINER

YOHA, CONNIE C

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 10/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/039,296

Applicant(s)

STEPHENSON ET AL.

Examiner

Connie C. Yoha

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-81 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26, 29, 30, 32-53, 55-68 and 73-81 is/are rejected.
- 7) ☐ Claim(s) 27, 28, 31, 54 and 69-72 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

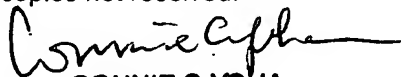
Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.


CONNIE C. YOHA
PRIMARY EXAMINER

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Amendment filed on 6/27/05 has been entered and are made of record.
2. Claims 1-81 are pending.
3. Claim 1, 17, 47 and 66 are amended.

Response to Arguments

- 3 Applicant's argument filed 6/27/05 has been fully considered.

Applicant's arguments with respect to claim 1-81 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1-26, 36-53, 55-68, and 73-81 are rejected under 35 U.S.C. 102(b) as being anticipated by Prinz, Pat. No. 5025416.

With regard to claim 1, Prinz discloses a memory cell comprising a magnetic element having a first, second and third segment for storing first, second and third remnant magnetic field respective in response to a write signal, wherein each of the first second and third remnant magnetic fields may have a first direction or a second direction, and wherein when the first, second and third remnant magnetic fields are in said first direction the memory cell is in a first orientation (first state), and wherein when the first, second and third remnant magnetic fields are

in said second direction the memory cell is in a second orientation (second state) (fig. 1(a) shows the legs 14) (col. 4, line 25-54); a single write line for applying said write signal to said magnetic element (col. 4, line 55-68); a sensor for detecting the orientation of the memory cell (col. 5, line 31-68) (also with regard to claim 4).

With regard to claim 2, Prinz discloses wherein each of the segment (fig. 1(a) the leg 14), second segment and third segment have an inner side and an outer side and wherein said remnant magnetic field exists in each of the first, second and third segments between said inner and outer sides (fig. 7, 52).

With regard to claim 3, Prinz discloses wherein the memory cell is in said first orientation, the inner side of each of said first second and third segments has a north magnetization and the outer side of each of said first, second and third segments has a south magnetization (col. 4, line 13-18, first easy axis); and wherein a memory cell is in said second orientation, the inner side of each of said first, second, and third segments has a south magnetization and the outer side of each of said first, second, and third segments has north magnetization (col. 4, line 13-18, second easy axis) (also with regard to claim 20, 22, 36, 37).

With regard to claim 5, Prinz discloses wherein the magnetic element and the sensing region are substantially parallel (col. 5, line 31-68) (also with regard to claim 6-8, 21, 23-24, 38, 55, 64-65, 73).

With regard to claim 9, 39 and 56, Prinz discloses said first, second, and third segment produces a first, second and third magnetic flux field respectively (col. 5, line 9-44); the first, second and third magnetic flux fields pass through a sensing region of the sensor (col. 5, line 31-

42); and the sensor is a Hall sensor and wherein the sensor is formed in a substrate and the inner side of each of the first, second, and third segments faces the sensing region (col. 5, line 35-68).

With regard to claim 10, Prinz discloses wherein the sensor is formed of a material that is compliant with a CMOS process (col. 5, line 35-42) (also with regard to claim 11-13, 40-43, 57-60, and 75-78).

With regard to claim 14, Prinz discloses wherein a metal layer is formed between said magnetic element and said sensor (col. 6, line 1-18) (also with regard to claim 15-16, 44-46, 61-63, and 79-81).

With regard to claim 17, Prinz discloses a memory cell comprising: a non-linear magnetic element (fig. 7, 52); and a single write line for storing a remnant magnetic field in said magnetic element (col. 4, line 25-54).

With regard to claim 18, Prinz discloses wherein said magnetic element has two or more segments (fig. 1a, leg 14 or 1b, leg 24)), wherein said segments are not co-linear (fig. 1a and 1b show a rectangular and triangle shape magnetic element) and wherein each of said segment stores a magnetic field (col. 3, line 9-44) (also with regard to claim 25 and 26).

With regard to claim 19, Prinz discloses memory further comprising a sensor formed in a substrate and having a sensing region and wherein magnetic flux fields produced by each of said magnetic fields pass through said sensing region (col. 5, line 31-68).

With regard to claim 47, Prinz discloses a memory cell comprising: at least two magnetic elements (fig. 6, array 50) (also with regard to claim 49-53); a sensor having a sensing region (col. 5, line 31-68); and a single write line for storing a remnant magnetic field in each of said magnetic elements, wherein, when the memory cell is in a first orientation, the magnetic field in

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each of said magnetic elements has a first direction with respect to said sensing region and when said memory cell is in a second orientation, the magnetic field in each of said magnetic elements has a second direction with respect to said sensing region (col. 4, line 25-68).

With regard to claim 48, Prinz discloses wherein in respect of each of the elements, the first direction is opposite to said second direction (col. 2, line 29-34).

With regard to claim 66, Prinz discloses a memory cell comprising: a magnetic element having a notched section (fig. 1b, legs 24 have notched section) (also with regard to claim 68); a single write line adjacent to said magnetic element for storing a remnant magnetic field in said magnetic element, wherein said magnetic field may have a first orientation (being a first state) or a second orientation (being a second state) (col. 4, line 25-68) (also with regard to claim 67); and a sensor for detecting the orientation of said magnetic field (col. 5, line 31-68) (also with regard to claim 74).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1-17, 29-30, 32-38, 47-53, 55-65, 73, and 75-81 are rejected under 35 U.S.C.

102(b) as being anticipated by Lienau, Pat. No. 5295097.

With regard to claim 1, Lienau discloses a memory cell (fig. 1, 20) comprising a magnetic element having a first, second and third segment for storing first, second and third remnant magnetic field respective in response to a write signal, wherein each of the first second

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and third remnant magnetic fields may have a first direction or a second direction, and wherein when the first, second and third remnant magnetic fields are in said first direction the memory cell is in a first orientation (first state), and wherein when the first, second and third remnant magnetic fields are in said second direction the memory cell is in a second orientation (second state) (col. 3, line 8-28) (also with regard to claim 2); a single write line for applying said write signal to said magnetic element (col. 2, line 51-55); a sensor for detecting the orientation of the memory cell (col. 2, line 45-51).

With regard to claim 3, Lienau discloses wherein the memory cell is in said first orientation (fig. 1, 24), the inner side of each of said first second and third segments has a north magnetization and the outer side of each of said first, second and third segments has a south magnetization; and wherein a memory cell is in said second orientation fig. 1, 24'), the inner side of each of said first, second, and third segments has a south magnetization and the outer side of each of said first, second, and third segments has north magnetization (also with regard to claim 36 and 37).

With regard to claim 4, Lienau discloses wherein said first, second and third remnant magnetic field has a first, second and third magnetic flux field (col. 2, line 67-col. 3, line 15); and said first, second and third magnetic flux fields pass through a sensing region of the sensor (col. 3, line 16-25) (also with regard to claim 33-34).

With regard to claim 5, Lienau discloses wherein the magnetic element and the sensing region are substantially parallel (col. 2, line 45-51) (fig. 1) (also with regard to claim 38, 35, 55, 64-65 and 73).

With regard to claim 6, Lienau discloses wherein the first, second and third magnetic flux fields have components that are substantially normal to the sensing region (col. 3, line 8-15) (also with regard to claim 7, and 8).

With regard to claim 9 and 56, Lienau discloses said first, second, and third segment produces a first, second and third magnetic flux field respectively (col. 2, line 56-66); the first, second and third magnetic flux fields pass through a sensing region of the sensor (col. 2, line 67- col. 3, line 1); and the sensor is a Hall sensor and wherein the sensor is formed in a substrate and the inner side of each of the first, second, and third segments faces the sensing region (col. 3, line 2-7)

With regard to claim 10, Lienau discloses wherein the sensor is formed of a material that is compliant with a CMOS process (col. 2, line 45-482) (also with regard to claim 11, 13, 57-60, and 75-78).

With regard to claim 12, Lienau discloses wherein the substrate is formed of silicon and wherein the sensor is formed by doping a region of the substrate (col. 4, line 57-63) (col. 5, line 24-28).

With regard to claim 14, Lienau discloses wherein a metal layer is formed between said magnetic element and said sensor (col. 5, line 24-37) (also with regard to claim 15, 61-63 and 79-81).

With regard to claim 16, Lienau discloses wherein the sensor has a current application line and a voltage measurement line and wherein the sensing region is defined by an intersection of said current application line and said voltage measurement line (col. 4, line 4-14).

With regard to claim 17, Lienau discloses a memory cell comprising: a non-linear magnetic element (fig. 1, 20); and a single write line for storing a remnant magnetic field in said magnetic element (col. 2, line 45-55).

With regard to claim 29, Lienau discloses wherein at least a portion of said magnetic element is curved (fig. 1, 19) (also with regard to claim 30, 32).

With regard to claim 47, Lienau discloses a memory cell comprising: at least two magnetic elements (fig. 3, plurality of magnetic elements) (col. 3, line 38-49) (also with regard to claim 49-53); a sensor having a sensing region (col. 2, line 45-54); and a single write line for storing a remnant magnetic field in each of said magnetic elements, wherein, when the memory cell is in a first orientation, the magnetic field in each of said magnetic elements has a first direction with respect to said sensing region and when said memory cell is in a second orientation, the magnetic field in each of said magnetic elements has a second direction with respect to said sensing region (col. 2, line 51-col 3, line 37).

With regard to claim 48, Lienau discloses wherein in respect of each of the elements, the first direction is opposite to said second direction (col. 2, line 56-60).

Allowable Subject Matter

8. Claim 27-28, 31, 54, 69-72 are objected as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record does not show the limitation of the magnetic element has five or six segments or that it has an incomplete toroid.

The prior art of record also does not show the limitation of the magnetic element has a trapezoidal cross-section and wherein said first and second magnetic elements positioned adjacent to said second magnetic element are shaped to correspond to the shape of the second magnetic element.

The prior art of record also does not show the limitation wherein the notched section has a trapezoidal shape defined by three sides of the magnetic elements.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to whose telephone number is (571) 272-1799. The examiner can normally be reached on Mon. - Fri. from 8:00 A.M. to 5:30 PM. The examiner's supervisor,

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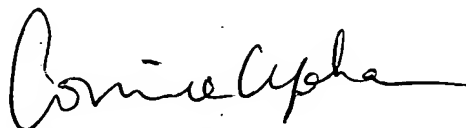
David Nelms, can be reached at (571) 272-1787. The fax phone number for this Group is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov> should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



C. Yoha

October 2005



CONNIE C. YOHA
PRIMARY EXAMINER